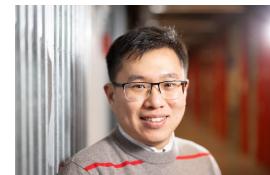


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Personal profile

Dr. Hongyang Cheng is Assistant Professor of Geomechanics at the University of Twente. He obtained his PhD on "multi-scale characterization of geosynthetic-reinforced soils" at Hiroshima University in 2016. He subsequently joined the Multi-Scale Mechanics group of the University of Twente and worked on "wave propagation in granular media" and "concurrent multi-scale modeling" until 2020. For his PhD work, he received the best student paper award at the DEM7 conference and a top downloaded paper award from "Granular Matter". Dr. Cheng has been giving invited lectures at the University of Pisa, Okayama University and the Japanese Geotechnical Society, and was the organizer and chair of the symposium "Open-Source Development" of the DEM8 conference in 2019. Dr. Cheng served as a guest editor for the special issue of *Computers and Geotechnics* "DEM for Geotechnics".

Qualifications

PhD, Multiscale characterization of geosynthetic-reinforced soil, Hiroshima University

1 Oct 2013 → 28 Sept 2016

Award Date: 28 Sept 2016

Master, Hiroshima University

1 Oct 2011 → 28 Sept 2013

Award Date: 28 Sept 2013

Employment

Assistant Professor

Soil MicroMechanics

University of Twente

1 Dec 2023 → present

Assistant Professor

MESA+ Institute

University of Twente

1 Jan 2018 → present

Research output

Contact rheological DEM model for visco-elastic powders during laser sintering

Alvarez, J. E., Nijkamp, A. H., Cheng, H., Luding, S. & Weinhart, T., May 2024, In: *Granular matter*. 26, 2, 28.

The force and dynamic response of low-velocity projectile impact into 3D dense wet granular media

Zhang, X., Zhao, H., Cheng, H., Wang, X. & Zhang, D., 1 Feb 2024, In: *Powder technology*. 434, 12 p., 119309.

Effect of vegetation on the hydro-mechanical properties of the vadose zone

Anselmucci, F. A. R., Cheng, H., Fan, X., Zeng, Y. & Magnanimo, V., Sept 2023, *Proceedings of the 8th International Symposium on DEFORMATION CHARACTERISTICS OF GEOMATERIALS Porto, 3rd - 6th September 2023*. International Society for Soil Mechanics and Geotechnical Engineering

Trending topics in computational mechanics of granular materials: from fundamentals to applications

Ye, X. & Cheng, H., 18 Jan 2023, In: *Acta Mechanica Sinica/Lixue Xuebao*. 39, 1, 722903.

Concurrent multi-scale modeling of granular materials: Role of coarse-graining in FEM-DEM coupling

Cheng, H., Thornton, A. R., Luding, S., Hazel, A. L. & Weinhart, T., 1 Jan 2023, In: *Computer methods in applied mechanics and engineering*. 403, Part A, 115651.

CG-enriched concurrent multi-scale modeling of dynamic surface interactions between discrete particles and solid continua

Cheng, H., Luding, S. & Weinhart, T., Jan 2023, In: *Acta Mechanica Sinica/Lixue Xuebao*. 39, 1, 722218.

Down to the root of vegetated soil: challenges and the state-of-the-art

Cheng, H., Anselmucci, F. A. R., Fan, X., Zeng, Y., Luding, S. & Magnanimo, V., 30 Nov 2022, In: *Papers in Physics*. 14, 140014.

弹性波穿越土工袋传播规律的数值模拟

Jia, F., Liu, S. & Cheng, H., 25 Nov 2022, In: *Journal of Hohai University*. 50, 6, p. 108-113 6 p.

Continuum-DEM modelling of fluid-solid transition in weakly compacted systems of polydisperse particles of varying shapes

Lubbe, R., Magnanimo, V., Luding, S., Cheng, H. & Gupta, P., Oct 2022. 1 p.

Noise and Vibration in Wet Soil: Micromechanical modelling for smart mitigation strategies

Joseph, S., Luding, S., Magnanimo, V., Cheng, H. & Harting, J., Oct 2022. 1 p.

Quantifying hydro-mechanical properties of vegetated soil

Anselmucci, F. A. R., Cheng, H., Zeng, Y. & Magnanimo, V., Oct 2022. 1 p.

Trends and Challenges in "Machine Learning" (Workshop 1)

Rocha, I., Abdelmalik, M., Cheng, H. & Maresca, F., Oct 2022, *Twenty-fifth Engineering Mechanics Symposium, October 25-October 26, 2022. Hotel Papendal, Arnhem*. van Outvorst, R. A. M. F. & van Litsenburg, A. J. J. T. (eds.). Eindhoven University of Technology, p. 14-14 1 p.

Simulation-guided optimization of granular phononic crystal structure using the discrete element method

Ostanin, I., Cheng, H. & Magnanimo, V., Aug 2022, In: *Extreme Mechanics Letters*. 55, 101825.

On the use of coarse-graining to bridge the discrete and continuum descriptions of granular materials

Cheng, H., 5 Jul 2022.

Bayesian Calibration of GPU-based DEM meso-mechanics Part II: Calibration of the granular meso-structure

Lubbe, R., Xu, W. J., Zhou, Q. & Cheng, H., Jul 2022, In: *Powder technology*. 407, 117666.

Bayesian calibration of GPU-based DEM meso-mechanics Part I: Parallelization of RVEs

Lubbe, R., Xu, W. J., Zhou, Q. & Cheng, H., Jul 2022, In: *Powder technology*. 407, 117631.

关于采用粗粒化提高颗粒材料多尺度模拟守恒特性的研究

Cheng, H. & Weinhart, T., 28 Jun 2022, In: *Jisuan Lixue Xuebao/Chinese Journal of Computational Mechanics*. 39, 3, p. 373-380 8 p.

Impact of wetting-drying cycles on the hydro-mechanical behaviour of vegetated soil

Anselmucci, F., Cheng, H., Zeng, Y., Fan, X. & Magnanimo, V., 28 Mar 2022. 1 p.

Performance study of iterative Bayesian filtering to develop an efficient calibration framework for DEM

Hartmann, P., Cheng, H. & Thoeni, K., Jan 2022, In: *Computers and Geotechnics*. 141, 104491.

Visco-elastic sintering kinetics in virgin and aged polymer powders

Alvarez, J. E., Snijder, H., Vaneker, T., Cheng, H., Thornton, A. R., Luding, S. & Weinhart, T., Jan 2022, In: *Powder technology*. 397, 117000.

Use of DEM in geomechanics: Special issue associated with the DEM 8 conference

O'Sullivan, C., Cheng, H. & Zhao, J., Sept 2021, In: Computers and Geotechnics. 137, 104167.

Direct numerical simulation of wave propagation in saturated random granular packings using coupled LBM-DEM

Cheng, H., Luding, S., Harting, J. & Magnanimo, V., 7 Jun 2021, *Powders & Grains 2021 – 9th International Conference on Micromechanics on Granular Media*. 14003. (EPJ Web of Conferences; vol. 249).

Elastic wave velocity and attenuation in granular material

Jia, F., Cheng, H., Liu, S. & Magnanimo, V., 7 Jun 2021, *Powders & Grains 2021 – 9th International Conference on Micromechanics on Granular Media*. (EPJ Web of Conferences; vol. 249).

Failure in granular materials based on acoustic tensor: a numerical analysis

Recchia, G., Cheng, H., Magnanimo, V. & La Ragione, L., 7 Jun 2021, *Powders & Grains 2021 – 9th International Conference on Micromechanics on Granular Media*. (EPJ Web of Conferences; vol. 249).

Neck growth kinetics during polymer sintering for powder-based processes

Alvarez Naranjo, J. E., Cheng, H., Snijder, H., Vaneker, T., Luding, S. & Weinhart, T., 7 Jun 2021, *Powders & Grains 2021 – 9th International Conference on Micromechanics on Granular Media*. (EPJ Web of Conferences; vol. 249).

Bayesian Uncertainty Quantification for Geomechanical Models at Micro and Macro Scales

Cheng, H., Magnanimo, V., Shuku, T., Luding, S. & Weinhart, T., 15 Jan 2021, *Challenges and Innovations in Geomechanics: Proceedings of the 16th International Conference of IACMAG - Volume 1*. Barla, M., Di Donna, A. & Sterpi, D. (eds.). Cham: Springer, p. 837-845 9 p. (Lecture Notes in Civil Engineering; vol. 125).

DEM simulation of anisotropic granular materials: elastic and inelastic behavior

Recchia, G., Magnanimo, V., Cheng, H. & La Ragione, L., 1 Nov 2020, In: *Granular matter*. 22, 4, 85.

Fast, flexible particle simulations — An introduction to MercuryDPM

Weinhart, T., Orefice, L., Post, M., van Schrojenstein Lantman, M. P., Denissen, I. F. C., Tunuguntla, D. R., Tsang, J. M. F., Cheng, H., Shaheen, M. Y., Shi, H., Rapino, P., Grannonio, E., Losacco, N., Barbosa, J., Jing, L., Alvarez Naranjo, J. E., Roy, S., den Otter, W. K. & Thornton, A. R., 1 Apr 2020, In: *Computer physics communications*. 249, 107129.

Elastic wave propagation in dry granular media: effects of probing characteristics and stress history

Cheng, H., Luding, S., Saitoh, K. & Magnanimo, V., 15 Mar 2020, In: *International journal of solids and structures*. 187, p. 85-99

Influence of Load Mode on Particle Crushing Characteristics of Silica Sand at High Stresses

Wu, Y., Yamamoto, H., Cui, J. & Cheng, H., 1 Mar 2020, In: *International Journal of Geomechanics*. 20, 3, 04019194.

Strain-accumulation mechanisms in sands under isotropic stress

Sajeva, A., Capaccioli, S. & Cheng, H., Dec 2019, In: *Journal of Geophysics and Engineering*. 16, 6, p. 1139-1150 12 p.

An iterative Bayesian filtering framework for fast and automated calibration of DEM models

Cheng, H., Shuku, T., Thoeni, K., Tempone, P., Luding, S. & Magnanimo, V., 15 Jun 2019, In: *Computer methods in applied mechanics and engineering*. 350, p. 268-294 27 p.

Hydro-micromechanical modeling of wave propagation in saturated granular crystals

Cheng, H., Luding, S., Rivas, N., Harting, J. & Magnanimo, V., 10 Apr 2019, In: *International journal for numerical and analytical methods in geomechanics*. 43, 5, p. 1115-1139 25 p.

Faster, more flexible particle simulations: The future of MercuryDPM

Thornton, A. R., Post, M., Orefice, L., Rapino, P., Roy, S., Polman, H., Shaheen, M. Y., Alvarez Naranjo, J. E., Cheng, H., Jing, L., Shi, H., Mbaziira, J., Roeplal, R. & Weinhart, T., 2019. 12 p.

Grain learning: Bayesian calibration of DEM models and validation against elastic wave propagation

Cheng, H., Shuku, T., Thoeni, K., Tempone, P., Luding, S. & Magnanimo, V., 3 Aug 2018, *Proceedings of China-Europe Conference on Geotechnical Engineering. Volume 1.* Wu, W. & Yu, H-S. (eds.). Vienna, Austria: Springer, p. 132-135 4 p. (Springer Series in Geomechanics and Geoengineering).

An iterative sequential Monte Carlo filter for Bayesian calibration of DEM models

Cheng, H., Luding, S., Magnanimo, V., Shuku, T., Thoeni, K. & Tempone, P., 22 Jun 2018, *Numerical Methods in Geotechnical Engineering IX: Proceedings of the 9th European Conference on Numerical Methods in Geotechnical Engineering (NUMGE 2018)*. Fernandes, M. D. M. (ed.). 1 ed. London: Taylor & Francis, Vol. 1.

Probabilistic calibration of discrete element simulations using the sequential quasi-Monte Carlo filter

Cheng, H., Shuku, T., Thoeni, K. & Yamamoto, H., Feb 2018, In: *Granular matter*. 20, 1, 11.

An analytical solution for geotextile-wrapped soil based on insights from DEM analysis

Cheng, H., Yamamoto, H., Thoeni, K. & Wu, Y., 1 Aug 2017, In: *Geotextiles and Geomembranes*. 45, 4, p. 361-376 16 p.

Calibration of micromechanical parameters for DEM simulations by using the particle filter

Cheng, H., Shuku, T., Thoeni, K. & Yamamoto, H., 30 Jun 2017, In: *EPJ Web of Conferences*. 140, 12011.

Bayesian calibration of microCT-based DEM simulations for predicting the effective elastic response of granular materials

Cheng, H., Pellegrino, A. & Magnanimo, V., 2017.

A Simple Multiscale Model for Granular Soils with Geosynthetic Inclusion

Cheng, H., Yamamoto, H., Guo, N. & Huang, H., 1 Aug 2016, *Proceedings of the 7th International Conference on Discrete Element Methods*. Xikui, L., Yuntain, F. & Graham, M. (eds.). Springer, p. 445-453 (Springer proceedings in physics; vol. 188).

Numerical study on stress states and fabric anisotropies in soilbags using the DEM

Cheng, H., Yamamoto, H. & Thoeni, K., Jun 2016, In: *Computers and Geotechnics*. 76, p. 170-183 14 p.

Evaluating the Performance of Geotextile Wrapped/Layered Soil: A Comparative Study Using the DEM

Cheng, H. & Yamamoto, H., 2016, *Geo-China 2016: Geosynthetic Civil Infrastructure, Disaster Monitoring, and Environmental Geotechnics*. Chao, S-J., Cui, X. & Pun, K-L. (eds.). American Society of Civil Engineers, p. 122-130 (Geotechnical special publications; vol. 261).

Discrete modeling of geotextile-wrapped soil under simple shear

Cheng, H. & Yamamoto, H., 2015, *Proceedings of the 4th International Conference on Particle-Based Methods - Fundamentals and Applications, PARTICLES 2015*. International Center for Numerical Methods in Engineering, p. 485-496 12 p.

Modeling microscopic behavior of geotextile-wrapped soil by discrete element method

Cheng, H. & Yamamoto, H., 2015, In: *Japanese Geotechnical Society Special Publication*. p. 2215-2220 6 p.

Activities

Generalized Particle-Continuum Coupling Methods for Multi-Physical Processes in Granular Materials

Hongyang Cheng (Keynote speaker), Juan Esteban Alvarez Naranjo (Contributor), Stefan Luding (Contributor), Andrew L Hazel (Contributor) & Thomas Weinhart (Contributor)

9 Oct 2023

From Granular Randomness to Predictive Digital Twins: Integrating Data-Driven and Coupled Models for Uncertainty Quantification

Hongyang Cheng (Keynote speaker)

20 Sept 2023

Multi-scale modeling of thermo-mechanically coupled processes in granular materials

Hongyang Cheng (Contributor), Juan Esteban Alvarez Naranjo (Speaker), Stefan Luding (Contributor), Andrew L Hazel (Contributor) & Thomas Weinhart (Contributor)

6 Jun 2023

3rd Doctoral School of the TUSAIL Innovative Training Network 2022

Hongyang Cheng (Reporter)

16 Nov 2022

15th World Congress on Computational Mechanic, WCCM 2022

Hongyang Cheng (Organiser), Klaus Thoeni (Organiser), Xue Zhang (Organiser) & Vanessa Magnanimo (Organiser)

31 Jul 2022 → 5 Aug 2022

Generalized FEM-DEM coupling for multi-scale modeling of granular materials using coarse-graining

Hongyang Cheng (Keynote speaker), Stefan Luding (Contributor), Anthony R. Thornton (Contributor), Andrew L Hazel (Contributor) & Thomas Weinhart (Contributor)

30 Jul 2022 → 5 Aug 2022

8th International Conference on Discrete Element Methods, DEM 2019

Hongyang Cheng (Organiser)

21 Jul 2019 → 26 Jul 2019

Direct simulation of wave propagation in fully saturated granular packings using coupled LBM-DEM

Hongyang Cheng (Speaker), Stefan Luding (Contributor), Jens Harting (Contributor) & Vanessa Magnanimo (Contributor)

21 Jul 2019 → 26 Jul 2019

GrainLearning: an efficient Bayesian uncertainty quantification framework for discrete element simulations of granular materials

Hongyang Cheng (Speaker), Takayuki Shuku (Contributor), Thomas Weinhart (Contributor) & Stefan Luding (Contributor)

21 Jul 2019 → 26 Jul 2019

Uncertainty quantification and propagation for multi-scale models of geomaterials : an iterative Bayesian approach

Hongyang Cheng (Speaker)

5 Mar 2019

Direct numerical simulation of wave propagation in dry and saturated granular media

Hongyang Cheng (Speaker)

28 Feb 2019

Computers and Geotechnics (Journal)

Hongyang Cheng (Guest Editor)

2019 → ...

Discrete element method for modeling wave propagation in dry and saturated granular media

Hongyang Cheng (Speaker)

11 Sept 2018

Coupled subpore-scale hydro-mechanical modeling of wave propagation in saturated granular media

Hongyang Cheng (Speaker), Stefan Luding (Contributor), Nicolás Rivas (Contributor), Jens Harting (Contributor) &

Vanessa Magnanimo (Contributor)

29 May 2018 → 1 Jun 2018

A Bayesian calibration toolbox for YADE

Hongyang Cheng (Speaker), Takayuki Shuku (Contributor), Klaus Thoeni (Contributor), Stefan Luding (Contributor) & Vanessa Magnanimo (Contributor)

26 Apr 2018 → 27 Apr 2018

Geosynthetics International (Journal)

Hongyang Cheng (Reviewer)

7 Sept 2017

International journal of hydrogen energy (Journal)

Hongyang Cheng (Reviewer)

29 Apr 2017 → ...

Granular matter (Journal)

Hongyang Cheng (Reviewer)

28 Feb 2017 → ...

Prizes

Best student paper award at the 7th International Conference on Discrete Element Methods

Cheng, Hongyang (Recipient), Aug 2016

IACMAG Excellent Paper: Junior

Cheng, Hongyang (Recipient), 30 Aug 2022

Japanese Government (Monbukagakusho) Scholarship

Cheng, Hongyang (Recipient), Oct 2011

Top 5 downloaded articles in 2018 in Granular Matter

Cheng, Hongyang (Recipient), Shuku, Takayuki (Recipient), Thoeni, Klaus (Recipient) & Yamamoto, Haruyuki (Recipient), 25 Apr 2019